Claims

I Claim:

1. A corrosion resistant brine fluid made by the process comprising:
providing a brine comprising:
water; and
a source of water-soluble cations where the cations are selected from the group consisting of lithium, sodium, potassium, calcium, magnesium, zinc, ammonium, cesium, rare earths, and mixtures thereof to form a brine with the water; and
adding an additive selected from the group consisting of water-soluble carbonates, water-soluble bicarbonates, and mixtures thereof, where the additive is in the form of a powder, in an amount effective to increase the pH of the brine fluid.

2. The corrosion resistant brine of claim 1 where the additive has a cation that is selected from the group consisting of sodium, potassium, magnesium, ammonium, and mixtures thereof.

3. The corrosion resistant brine fluid of claim 1 where the density of the brine ranges from about 8.4 to about 22.5 pounds/gal (about 1.0 to about 2.7 kg/l).

4. The corrosion resistant brine fluid of claim 1 where the source of water-soluble cations is a salt selected from the group consisting of chloride, bromide, acetate, and formate salts having cations selected from the group consisting of lithium, sodium, potassium, calcium, magnesium, zinc, ammonium, cesium, and mixtures thereof.

5. The corrosion resistant brine fluid of claim 1 where the source of water-soluble zinc cations is selected from the group consisting of zinc chloride and zinc bromide.

6. The corrosion resistant brine fluid of claim 1 where the additive is selected from the group consisting of sodium carbonate, sodium bicarbonate, and mixtures thereof.

7. The corrosion resistant brine fluid of claim 1 where the additive is present in a mole ratio to water-soluble cation ranging from about 0.05/1 to about 2.0/1.

8. The corrosion resistant brine fluid of claim 1 where the additive is present in an amount from 0.1 to 10 wt.% based on the amount of water-soluble cation.

9. The corrosion resistant brine fluid of claim 1 where the fluid has reduced corrosion with respect to iron-based metals and alloys as compared with an identical brine fluid absent the additive.

10. The corrosion resistant brine fluid of claim 1, where in the process of adding the additive, the additive powder ranges in size from about 5 to about 500 microns.

11. A corrosion resistant brine fluid made by the process comprising:

providing a brine comprising:

water; and

a source of water-soluble zinc cations to form a brine with the water; and

adding an additive selected from the group consisting of carbonates, bicarbonates, and mixtures thereof where the cation is selected from the group consisting of sodium, potassium, magnesium, ammonium and mixtures thereof, where the additive is in the form of a powder, in an amount effective to increase the pH of the brine fluid;

where the density of the brine ranges from about 8.4 to about 22.5 pounds/gal.

12. A method for increasing the corrosion resistance of a brine fluid comprising:
providing a brine comprising:
water;
a source of water-soluble cations where the cations are selected from the group consisting of lithium, sodium, potassium, calcium, magnesium, zinc, ammonium, cesium, rare earths, and mixtures thereof to form a brine with the water; and
adding an additive selected from the group consisting of water-soluble carbonates, water-soluble bicarbonates, and mixtures thereof.

13. The method of claim 12 where in adding the additive, the additive has a cation selected from the group consisting of sodium, potassium, magnesium, ammonium and mixtures thereof.

14. The method of claim 12 where in providing the brine, the density of the brine ranges from about 8.4 to about 22.5 pounds/gal (about 1.0 to about 2.7 kg/l).

15. The method of claim 12 where in providing the brine the source of water-soluble cations is a salt selected from the group consisting of chloride, bromide, acetate, and formate salts having cations selected from the group consisting of lithium, sodium, potassium, calcium, magnesium, zinc, ammonium, cesium, and mixtures thereof.

16. The method of claim 12 where in providing the brine the source of water-soluble zinc cations is selected from the group consisting of zinc chloride and zinc bromide.

17. The method of claim 12 where in adding the additive, the additive is selected from the group consisting of sodium carbonate, sodium bicarbonate, and mixtures thereof.

18. The method of claim 12 where in adding the additive, the additive is present in a mole ratio to water-solubl cation ranging from about 0.05/1 to about 2.0/1.

19. The method of claim 12 where in adding the additive, the additive is present in an amount from 0.1 to 10 wt.% based on the amount of water-soluble cation.

20. The method of claim 12 further comprising pumping the brine fluid downhole in a hydrocarbon recovery operation.

21. The method of claim 12 further comprising contacting the brine fluid with iron-based metals or alloys and where a corrosion rate of the metals and alloys is reduced as compared with an identical brine fluid absent the additive.

22. The method of claim 12 where the additive powder ranges in size from about 5 to about 500 microns.